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INFO SHEET

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Endophytes in U.S. Horse Pastures

A USDA study detected an endophytic fungus and its associated toxin in summer horse pastures from all regions of the country. Because the toxin can have multiple adverse effects on horse health, particularly that of broodmares and newborn foals, horse owners and veterinarians should be aware that horses in all regions of the country may be exposed to the toxin.

Fescue can be infected by an endophytic fungus. Tall fescue grass is an adaptive and very aggressive forage grass grown in many regions of the United States. In many instances, in the midwest and south, fescue has replaced established forages.

The endophyte's toxins, primarily ergovaline, may cause reproductive and other disorders in horses grazed on infected fescue. Mares affected by the toxin may have a variety of problems, especially in late pregnancy. Ingestion of toxin may result in lack of udder development, prolonged gestation, lack of colostrum, and decreased milk production. These problems may lead to weak foals and increased foal mortality. Mares grazing infected fescue are less likely to become pregnant.

The USDA's National Animal Health Monitoring System (NAHMS) collected data on equine health and management practices from a representative sample of equine operations in 28 states¹. These operations represented about three-fourths of the equine population and three-fourths of operations with equids in the U.S. Overall 2,904 operations with one or more equids participated in the Equine '98 Study's first interviews from March 16 through April 10, 1998. Equine management data were collected during this and other personal interviews with equine owners or operators. More detailed information on the study and

the sampling methodology is available in NAHMS Equine '98 tabular summary reports.

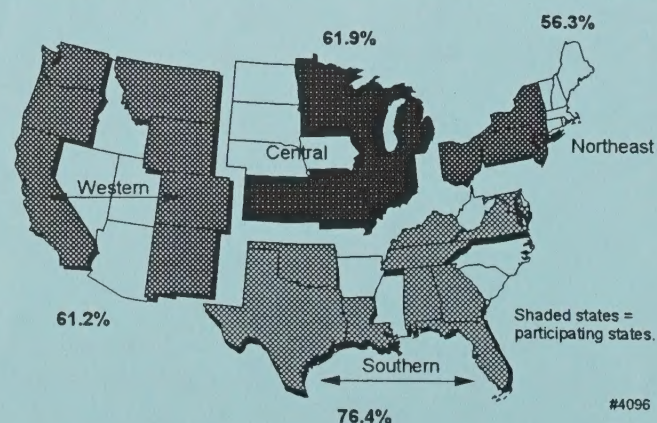
To be eligible to have pasture sampled as part of Equine '98, participants needed to have available pasture and three or more horses on their operation. Overall, stem samples were collected and tested from 888 of 1,082 (82 percent) participants eligible for sampling from June 15 through September 11, 1998.

Nationally, a total of 61.6 percent of the samples from pastures were test positive for endophyte, while endophyte was found in 56.3 percent, 76.4 percent, 61.9 percent, and 61.2 percent of the pastures in the Northeast, Southern, Central, and Western regions respectively (Figure 1). Less than half of the stems tested in most infected pastures were test positive for endophyte. However, without intervention, low initial pasture infection rates will increase over time due to infected fescue grasses' ability to out-compete non-infected fescue grasses.

A total of 28.5 percent of the samples were test positive for toxin. Approximately one-third of operations in the Central, Southern, and Northeast regions had pastures with detectable levels of toxin, while 18.9 percent of

Figure 1

Percent of Operations Where Summer Pasture
Samples Were Positive for Endophyte by Region



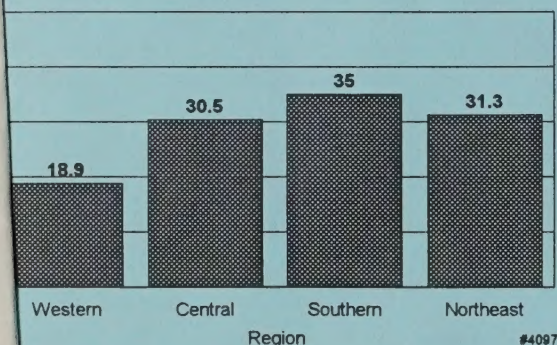
¹ Alabama, California, Colorado, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, Wisconsin, and Wyoming.

Table 1. Percent of operations by toxin levels and by region.

Parts per Billion (ppb)	Western		Central		Southern		Northeast		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
0	81.1	(4.0)	69.5	(6.2)	65.0	(9.0)	68.7	(6.6)	71.5	(3.4)
1-49	5.8	(2.0)	6.8	(3.4)	5.3	(2.7)	3.8	(1.6)	5.1	(1.2)
50-199	9.4	(3.0)	18.0	(4.7)	25.2	(8.8)	15.3	(5.9)	15.8	(2.9)
200-399	1.7	(1.2)	3.8	(2.2)	4.3	(3.0)	10.6	(1.9)	6.0	(1.9)
400 or more	<u>2.0</u>	(1.9)	<u>1.9</u>	(1.7)	<u>0.2</u>	(0.1)	<u>1.6</u>	(0.8)	<u>1.6</u>	(0.8)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of Operations Where Summer Pasture Samples Were Positive for Toxin by Region

Percent Operations



Operations participating from the Western region positive for toxin (Figure 2).

ly, nearly three-fourths (71.5 percent) of ns had toxin levels of 0 parts per billion (ppb), percent of operations had levels of 400 ppb or Regional estimates of toxin levels are provided 1.

Rainfall, season and other environmental factors have been associated with variations in toxin levels. In this study pasture samples were taken only once during the summer months, and toxin levels may have varied if samples had been taken at different times of the year.

The level of toxin in pasture at which disease will occur in horses is dependent on the amount of pasture consumed and the horse's status (late in pregnancy vs. not pregnant). However, any detectable level of toxin may be harmful to horses. Horses in all regions of the U.S. are at risk of developing problems associated with endophyte-infected pastures as all regions had pastures that were positive for both the endophyte and the toxin. Disease potentially caused by the toxin on participating operations was not evaluated.

Study participants reported whether or not the pasture to be sampled contained fescue grass. Endophyte was found in 78.6 percent of the samples with fescue grass. Toxin was found in over one-half (54.4 percent) of the samples with fescue grass. For samples that reportedly did not contain fescue grass, endophyte was found in

57.1 percent and toxin found in 21.4 percent. Possibly the endophyte infected other grasses or participants incorrectly identified pastures as not containing fescue grass.

Fescue's aggressive and adaptive nature may allow it to be the predominant grass type in overgrazed or poor quality pasture. However, percentages of samples positive for endophyte and toxin were not statistically different based on the estimated percentage of edible vegetation or the estimated forage quality in the summer of 1998.

Historically, strategies to lower the risk of health problems associated with horses grazing fescue grass pastures have been successful. Infected pastures should be treated with herbicides to kill the grass, with precautions taken to prevent the animals from being exposed to the herbicides. Once the infected plants have been killed, pasture can be reseeded with either tall fescue seed certified free of endophyte or another type of forage. It is difficult to establish endophyte-free pastures because seeds left in the soil from infected plants can sprout. In addition, endophyte-free fescue requires more management and can be grazed less intensively than other pastures.

Placing mares on non-fescue pastures or endophyte-free fescue pastures or removing mares from pasture altogether and feeding hay known to be endophyte-free are the best options. Removing mares from infected pastures and hay by day 300 of gestation until confirmed in foal again will also prevent the occurrence of fescue toxicosis. If it is not practical to keep mares off endophyte-infected pastures or hay, mares could be treated with domperidone. This drug has been used to prevent fescue toxicosis. A veterinarian should be contacted for more information on the use of domperidone.

For more information, contact:

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